

REMARKS

Claims 1, 3-4 and 7-12 were examined in the Final Office Action mailed March 4, 2010. The Applicant notes with appreciation the withdrawal of the previously pending rejections and objections, and the acceptance of the Terminal Disclaimer filed on November 30, 2009.

The following objections and rejections entered in the March 4, 2010 Final Office Action are currently pending:

- Objection to claim 1 for the presence of redundant language.
- Objection to claims 3 and 10 under § 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of claim 1.
- Rejection of claim 12 under 35 U.S.C. § 112, second paragraph, as indefinite, on the ground that there is insufficient antecedent basis for the limitation "new modules" in line 2, and further it being unclear how a module can be inspected, repaired and new.
- Rejection of claims 1, 3-4, 7, 9-10 and 12 under 35 U.S.C. § 103(a) as unpatentable over European Patent No. EP 0 708 877 B1 to Yaworsky, *et al.* ("Yaworsky"), in view of U.S. Patent Publication No. US 2002/0100159 ("Swartz").
- Rejection of claims 8 and 11 under § 103(a) as unpatentable over Yaworsky and Swartz in further view of U.S. Patent No. 5,285,572 to Rathi, *et al.* ("Rathi").

The Applicant notes the indications in the June 2, 2010 Advisory Action that the previously proposed amendments (repeated above, along with additional amendments) would overcome the § 112 rejection of claim 12 and the objection to claim 3. For purposes of maintaining a clear record, the Applicant has included the previously submitted arguments to overcome these issues in the remarks below, thereby ensuring all of the responses to the rejections in the March 4, 2010 Final Office Action are present in this paper.

1. The Objection to the Language of Claim 1 Is Addressed. The Applicant has amended claim 1 to remove a portion of the objected-to language. In addition, the Applicant has further amended this portion of claim 1 to ensure certain non-redundant material is not eliminated. Specifically, the original language was directed to the recited repair stations being equipped and configured to address specific repairs. In order to preserve this limitation in view of the prior amendments and the Examiner's suggestion, the Applicant has amended claim 1 to read: "wherein modules and/or assemblies and/or individual parts to be repaired of at least one gas turbine are moved through repair stations adapted for the purpose of carrying out specific repair steps."

2. The Objection to the Claims 3 and 10 Would Be Addressed. The Applicant has canceled claim 10, without prejudice to the subject matter therein.

As to claim 3, the Applicant submits that claim 3's limitations are not present in amended claim 1, and requests the pending objection to this claim be withdrawn. Claim 1 recites that modules, assemblies and/or parts "are repaired in different repair lines containing repair stations," and that there "two or more repair steps are carried out in succession within *one* repair line." Claim 3 requires *each* of the repair lines to be "subdivided into at least two repair steps." Because claim 1 only requires one repair line to be so divided, claim 3's requirement for *each* line to be divided makes clear that claim 1 has a different scope than claim 3. Accordingly, reconsideration and withdrawal of the objection to claim 3 is respectfully requested.

3. Claim 12 Is Clear and Its Limitations Have Antecedent Basis.

The Applicant respectfully request withdrawal of the pending § 112, second paragraph, rejection.

As discussed in original Specification ¶ [0022], if a component cannot be repaired, assembly of a turbine following the repair process may be completed with a new component, and thus there is sufficient description of the subject matter of claim 12 in the Specification. As to the claim language itself, the Applicant submits that there is nothing unusual about introducing a new element into a dependent claim, and that in the case of claim 12, there is no claim drafting issue with the addition of “new modules and/or assemblies and/or individual parts” in the claim.

As to the asserted lack of clarity as to “how a module can be inspected, repaired and new,” the Applicant submits that when read in the context of the original disclosure, as required, claim 12 is perfectly clear to one of ordinary skill. As noted in Specification ¶ [0022], after the repairs are performed on the modules, assemblies and/or individual parts, during the subsequent turbine assembly repaired modules, assemblies and parts may be supplemented by new modules/assemblies/parts may be substituted for unserviceable ones, as needed.

This feature is exactly what is claimed in claim 12: “wherein gas turbines are assembled from inspected and/or repaired and/or new modules and/or assemblies and/or individual parts after repair.” In other words, one of ordinary skill would understand that the phrase “after repair” refers to after the turbine repairs as a whole have been completed and the components are ready for

assembly into a turbine; this is the only reading of the language of claim 12 which is both consistent with the original Specification, and does not result in a nonsensical interpretation in which one of ordinary skill, having read ¶ [0022], would believe that the phrase “after repair” modifies the “new” parts such that the new parts have somehow been repaired.

Because it cannot be reasonably asserted that one of ordinary skill would misinterpret the language of claim 12 in a manner inconsistent with the Specification’s teachings, reconsideration and withdrawal of the pending § 112, second paragraph rejection of claim 12 is respectfully requested.

4. The Claims Are Patentable Over Yaworsky, Swartz and Rathi.

The Applicant respectfully traverses the rejections of the claims based on the Yaworsky, Swartz and Rathi references, on the grounds that these reference do not disclose or suggest all of the features of the present invention recited in the pending claims.

Yaworsky and Swartz. The Yaworsky reference is cited as teaching a method for maintenance of gas turbines in which the turbines are disassembled into modules and inspected and/or repaired, wherein the repair is subdivided into at least two repair steps. March 4, 2010 Final Office Action at 3 (citing Yaworsky at 14:30-43).

Swartz is cited as teaching steps in which a module is moved through repair stations in different repair lines (30, 32), “with a decision on the repair line to which a module to be repaired will be sent being made after inspection of the modules. *Id.* at 3-4 (citing Swartz ¶¶ [0018]-[0022], [0030]; Fig. 1). Swartz is

further cited as teaching that the modules are moved discontinuously on a cycle through the repair stations or the repair lines, where “discontinuous” is interpreted as referring to removing defective products from the assembly line for subsequent rework or scrapping. *Id.*, at 4.¹

Response to Advisory Action Comment 1: In response to Comment 1 (“Applicant argues on pages 9-10 that Yaworsky does not disclose having different worksites and having multiple repair lines”), the Applicant was not attempting to argue that the rejection was improper because Yaworsky individually was deficient. Rather, the Applicant was only establishing that Yaworsky at best documents the previous conventional approach, in which all aeroturbine work was conducted at one station, and rebutting any inference in the Final Office Action that Yaworsky provides *any* suggestion of the “subdivided” repairs being conducted anywhere but as the same station as the turbine was disassembled, as has long been the practice in the art.

Thus, the following remarks on Yaworsky should be viewed as focusing on the conventional single-station approach taught by this reference, and the lack of anything suggesting aeroturbine maintenance in an assembly-line-type system, whether by itself or in combination with any other reference.

The Applicants respectfully submit that Yaworsky actually only teaches the prior art approach that is *precisely* the sort of maintenance activity the present invention leaves behind. As noted in the Applicants’ previous response, “the maintenance and servicing of gas turbines ... has been based on the so-called workshop principle” in which the gas turbine “remains ... at one position or at one location” and “[t]he material, tools and personnel required to carry out

¹ The Applicant notes that this interpretation of “discontinuous” is inconsistent with the Applicant’s use of the term in the original Specification. As indicated, *e.g.*, in ¶¶ [0010], [0034], the aeroturbine components are moved *sequentially through a series of repair stations* on a repair line in “discontinuous” manner, *i.e.*, they are not moved along a conveyor belt that is in constant motion, but instead along a line in which components are *periodically* shifted to the next station in the line – a non-continuous (*i.e.*, “discontinuous”) movement along the line. In view of this unmistakable meaning given by the Applicant, the interpretation that “discontinuous” refers to *removing* components from the line, as in Swartz, is impermissibly overbroad.

the work are made available” to the turbine’s location. Specification ¶ [0004].

The prior art approach, however, had several disadvantages, including “that the maintenance process does not follow a defined structure” and due to “disturbances and delays” (for example, unforeseen problems identified during each gas turbine’s disassembly) “long times are required for maintenance and for servicing.” *Id.* ¶ [0005]. In contrast, the present invention “has overcome the previous prejudice that the conveyor belt principle is suitable only for new production of gas turbines, in particular aeroengines, but is not suitable for repairing them,” in part because “[i]n contrast to new production, the required work steps are not always the same for repairing gas turbines, in particular aeroengines, but are always dependent on the specific condition of the aeroengine to be repaired.” *Id.* ¶ [0008].

In Yaworsky, the gas turbine is disassembled, but there is no disclosure – or even a hint – at the conduct of this work at different worksites (let alone one a conveyor-principle work line). Rather, all that the cited paragraph states is that once the turbine’s combustion chamber assembly is separated into its two major components (bulkhead 58 and chamber hooded portion 32b), these components may be separately repaired (the separation of the hood from the bulkhead being Yaworsky’s advance to the prior practice of conducting repairs on the one-piece combustion chamber hood and outer bulkhead assembly, a procedure which was labor and special tool-intensive). *Thus, there is nothing in Yaworsky which begins to suggest anything other than the conventional repair of the turbine at one station in the conventional one-station prior art approach*

(regardless of how many subassemblies are “separately” repaired at the one station). Yaworsky therefore cannot reasonably be cited as teaching anything beyond the already-known conventional stationary approach to turbine maintenance, and cannot be cited as suggesting anything pointing toward its combination with any other reference to obtain the present invention.

Response to Advisory Action Comments 2, 3 and 4: In response to the comment that the claims do not recite a step of determining whether and what sort of repair is required,” but only require “a decision on the repair line to which a part to be repaired will be made after inspection of the parts,” the Applicant notes that this portion of the after-final Swartz argument is directed to establishing that Swartz’ *new* component assembly line does not disclose or suggest the steps involved in a *repair* operation (such as determining whether and what sort of repair is needed). Thus, the Applicant was not arguing a feature of the present invention which was not claimed, but making the point that a new component assembly line cannot reasonably be held out as teaching or suggesting the application of new component assembly techniques to the very different operations in aeroturbine *repair*.

As to the comment that Swartz’s cylinder head assembly process can be deemed a “repair” line, the Applicant strongly disagrees with the suggestion that aeroturbine repair work can be assumed to be “equivalent” to new component assembly in the context of aeroturbine maintenance, particularly in view of the teachings in the original disclosure. Indeed, the interpretation of repair work being the “equivalent” of new component assembly is tantamount to a little more than an unsupported summary assertion that it would be *a priori* obvious to apply assembly-line techniques to aeroturbine repair – despite the fact that such an assertion would be *directly contrary* to the record evidence in the original disclosure that such an approach to aeroturbine repair was not believed to be practical – *moreover, it would be directly contrary to the fact that those of ordinary skill were already well aware that new aeroturbine assembly is conducted on assembly lines, and yet – despite clearly being aware of, and knowing how to apply, assembly line techniques to new aeroturbine assembly – they had not applied such techniques to repair operations over the past several decades.* Thus, the Applicant maintains that “new” and “repair” operations are not fungible in the manner asserted.

As a separate matter, even assuming, *arguendo*, that the new cylinder head assembly work being conducted on Swartz “lines” 30, 32 could be characterized as “repair,” claim 1 requires: (i) “the modules and/or

assemblies and/or individual parts are repaired in different repair lines containing repair stations” and (ii) the “decision on the repair line to which a module and/or assembly and/or individual part to be repaired will be sent being made after inspection of the modules and/or assemblies and/or individual parts.” This is not what is taught by Swartz:

First, the Final Office Action cited Swartz elements 30, 32 as the recited “different repair lines,” and then maintained that the decision “on the repair line to which a module to be repaired will be send” is made “after inspection of the modules.” March 4, 2010 Final Office Action at 3-4. Claim 1 requires a repair *line* to contain repair *stations*. The asserted “different repair lines” 30, 32 in fact are individual cylinder head assembly stations – both of which are common to a single assembly *line* (“assembly apparatus 10”) – they are not the recited “different repair lines containing repair stations.” (Alternatively stated, if the stations 30, 32 are considered “lines,” Swartz does not disclose or suggest multi-station repair lines.)

Second, claim 1 requires a decision as to which of the different repair lines a component is to be sent to be made *after* inspection, *i.e.*, *before* the component is passed to a repair *line* for repair work (“the repair line” recitation in this portion of claim 1 plainly referring to one of the “different repair lines” recited in the immediately proceeding portion of the claim). Thus, contrary to the Advisory Action comment, this feature is recited in the claims. Further, Swartz does not disclose or suggest this feature – the *only* inspection disclosed in Swartz is a test *after* the new cylinder heads have been *removed* from the new assembly stations 30, 32 (prior to incoming new cylinder head castings being run through the assembly stations 30, 32, the robot 52 conducts no inspections – it only picks up the next cylinder head on the conveyor belt and places it on whichever of stations 30, 32 is currently free. Thus, Swartz does not teach or suggest claim 1’s requirement for making “a decision on the repair line to which a [component] will be sent ... after inspection” of the components.²

In the context of the foregoing, the following substantially restates the remarks regarding Swartz presented in the Applicant’s May 17, 2010 After-Final Amendment.

² In response to Comment 4, wherein it is asserted that the claims only require “that a decision is made where it [the component to be repaired] will be moved,” this statement fails to read this small portion of claim 1 in context (*i.e.*, reading the claim as a whole). As discussed above, merely deciding where to send a component is *not* all that claim 1 requires – read as a whole, claim 1 requires an inspection to *first* occur, and *then* a decision is made as to which of the “different repair lines” (each having at least two repair *stations*) to send the component. There is no suggestion of such an arrangement or process in Swartz.

Swartz is cited as teaching “modules to be repaired [being] moved through repair stations in order to carry out repair steps,” a decision on which repair line being made “after inspection of the modules,” and modules being “moved discontinuously on a cycle through the repair stations.” March 4, 2010 Final Office Action at 3-4. The Applicants respectfully submit that Swartz does not teach – even with the broadest reasonable interpretation, these features of the invention recited in the pending claims.

Swartz actually teaches:

- An automotive engine cylinder head assembly workcell 10.
- Receipt of bare cylinder heads into work cell 10 on conveyor 74.
- Loading of automotive engine cylinder heads by robotic machine 72 from conveyor 74 onto work-piece sliding feeding tables 70, 70' *whenever a table 70, 70' is empty.*
- Assembly of completed cylinder head (with valves, valve springs, valve keepers, etc.) by robots 50, 50'.
- Following completion of an air test to verify correct assembly, robots 50, 50' place the completed cylinder heads on sliding tables 70, 70', and
- Robot 72 places completed cylinder heads which passed the air test on delivery conveyor 34 for delivery to subsequent engine assembly stations, and places completed cylinder heads which did not pass the air test onto pallet 140 for later examination for inspection, repair and/or salvage.

Swartz Fig. 1 is reproduced below:

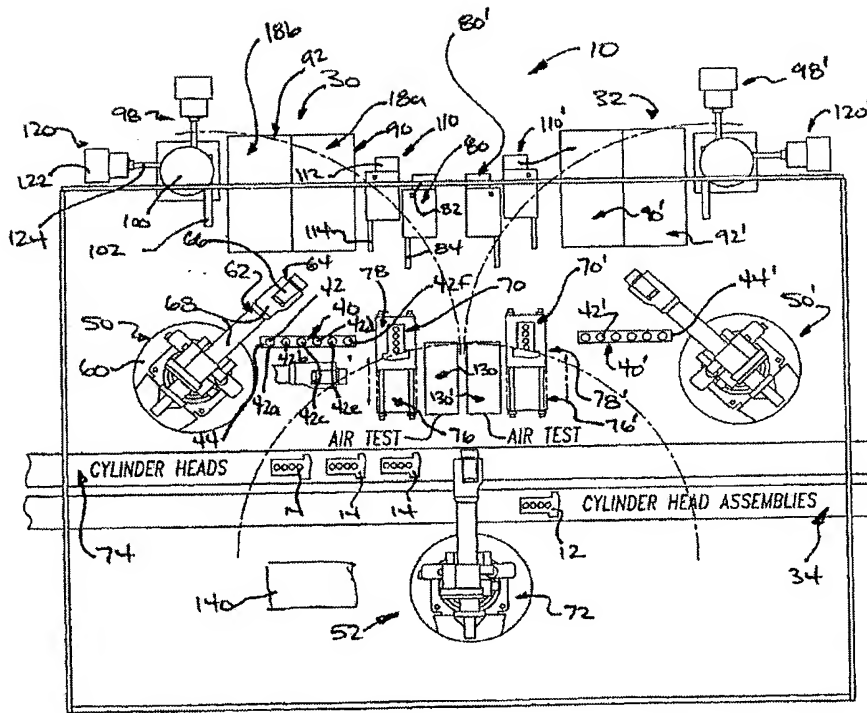


Fig-1

As a first matter, Swartz is directed to a new product assembly process, *i.e.*, there is no evaluation before the new cylinder heads are inserted into the workcell to determine whether and what sort of repair is required – obviously, because Swartz never contemplated any repair on this new product assembly line. Accordingly, the assertion in the pending Final Office Action that Swartz teaches transport of “modules to be repaired” are “moved through repair stations” is unsupportable.³

3 Nor can it reasonably be asserted that Swartz may be read “broadly” as pointing one of ordinary skill toward the present invention’s approach to handling turbine repairs. Conventional robotic assembly lines such as Swartz’ have been well known for decades. Yet despite the existence of this knowledge in the art, nothing in Swartz or elsewhere suggested going against the conventional wisdom in the turbine maintenance field *that turbine repairs were not suited to production line techniques* to attempt to obtain the present invention. The present invention and the state of the prior art provide what amounts to a textbook example of the sort of indications of non-obviousness the Supreme Court provided in the *KSR* decision as supporting patentability.

Nor does Swartz teach or suggest “modules repaired on different repair lines 30, 32.” March 4, 2010 Final Office Action at 3. The work stations 30, 32, are not “repair lines” in any reasonable interpretation of this term *in the context of the original Specification, as required*. As noted in Swartz ¶ [0022], elements 30, 32, are “first and second assembly cells 30 and 32, respectively,” which “are similarly equipped and operated” to perform the *same* new cylinder head assembly processes.

Further, contrary to the assertion that “a decision on the repair line to which a module to be repaired will be sent [is] made after inspection of the modules,” the only optional new cylinder head assembly routing decision taught in Swartz is a decision as to where the completed cylinder head assembly should be sent *after* the cylinder head emerges from the assembly cells 30, 32: if the air test is passed, the new cylinder head assembly is placed on out-going conveyer 34; if the air test is failed, the new cylinder head assembly is stacked on pallet 140 for later rework or scraping. Swartz ¶ [0029]. In other words, the pending rejection is internally inconsistent, because even if assembly cells 30, 32 were considered to be “repair lines,” no decision as to “the repair line to which a module to be repaired will be sent” is made *after* the new cylinder head assemblies leave the assembly cells 30, 32.

Finally, Swartz does not teach or suggest a further feature of the present invention. It is maintained that Swartz teaches that “modules are moved discontinuously on a cycle through the repair stations or the repair lines,” where the movement is asserted to be “discontinuous in that modules that fail the air

test are moved to a different station than those that pass [the air test].”

March 4, 2010 Final Office Action at 4. As used in the original disclosure of the present application, “discontinuously cycled” refers to the conveyor line concept of advancing elements down a line on a regular cycle, where the elements stop at stations for work to be performed, *i.e.*, a non-continuous conveyor movement.

See, e.g., Original Specification ¶ [0008].

Swartz teaches that the new cylinder head assemblies which fail the air test are simply set aside on a pallet – there is simply no further teaching as to their disposition, other than they will subsequently be looked at to determine whether to re-work or scrap the failed assemblies – there is *no* form of conveyor involved here (it is a dead-end dumping of failed components on a scrap pallet), let alone the sort of continuous conveyor advance, halt, station-work, advance to next station for further work, etc. discontinuous cyclic movement.

In sum, the Applicants submit that, even stretching Swartz to the absolute limits of reasonable interpretation of claim terms (as they are defined and used in the original disclosure – the required context), Swartz’ robotic new cylinder head assembly process would not have given one of skill in the art any reason to apply assembly line techniques to Yaworsky’s one-stop turbine repair station, against the conventional wisdom that turbine repairs were not suitable for conveyor line-type processing, ***particularly where those of ordinary skill were already well aware of the use of assembly line techniques in new aeroturbine assembly but had not – over the course of several decades – applied such techniques to aeroturbine maintenance operations.***

Accordingly, reconsideration and withdrawal of the pending § 103(a) rejections based on these references is respectfully requested.⁴

CONCLUSION

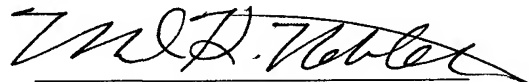
In view of the foregoing, the Applicant submits that claims 1, 3-4, 7-9 and 11-12 are in condition for allowance. Early and favorable consideration, and issuance of a Notice of Allowance for these claims is respectfully requested.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket # 011235.55726US).

Respectfully submitted,

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⁴ The Rathi reference, cited for inclusion of a heat treatment process in an assembly line, does not otherwise cure the deficiencies of the Yaworsky and Swartz references. Claims 8 and 11 are therefore also patentable over these references under § 103(a).